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U.S. General Land Office

Restoration of lost or
obliterated corners...

Washington

1916

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1917

GENERAL LAND OFFICE

RESTORATION

OF

LOST OR OBLITERATED CORNERS

AND

SUBDIVISION OF SECTIONS

Revision of June 1, 1909

[Reprinted July 1, 1916]



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Box 443

WASHINGTON
GOVERNMENT PRINTING OFFICE
1916

PENALTIES FOR DESTROYING CORNER MONUMENTS.

To aid in the protection of all evidences of public-land surveys, a clause was enacted in chapter 398, 29 United States Statutes, page 343, prohibiting the destruction or removal of monuments of any United States survey, and fixing penalties for violation.

This clause was amended by section 57 of the act approved March 4, 1909, revising and amending the penal laws of the United States, to read as follows:

SEC. 57. Whoever shall willfully destroy, deface, change, or remove to another place any section corner, quarter-section corner, or meander post, on any Government line of survey, or shall willfully deface, change, or remove any monument or bench mark of any government survey, shall be fined not more than two hundred and fifty dollars, or imprisoned not more than six months, or both.

RESTORATION OF LOST OR OBLITERATED CORNERS.

DEPARTMENT OF THE INTERIOR,
GENERAL LAND OFFICE,
Washington, D. C., June 1, 1909.

1. The increasing number of letters from county and local surveyors received at this office making inquiry as to the proper method of restoring to their original position lost or obliterated corners marking the survey of the public lands of the United States, or such as have been willfully or accidentally moved from their original position, have rendered the preparation of the following general rules necessary, particularly as in a very large number of cases the immediate facts necessary to a thorough and intelligent understanding are omitted. Moreover, surveys having been made under the authority of different acts of Congress, different results have been obtained, and no special law has been enacted by that authority covering and regulating the subject of the above-named inquiries. Hence, the general rule here given must be considered merely as an expression of the opinion of this office on the subject, based, however, upon the spirit of the several acts of Congress authorizing the surveys, as construed by this office, and by United States court decisions. When cases arise which are not covered by these rules, and the advice of this office is desired, the letter of inquiry should always contain a description of the particular corner, with reference to the township, range, and section of the public surveys, to enable this office to consult the record.

2. An obliterated corner is one where no visible evidence remains of the work of the original surveyor in establishing it. Its location may, however, have been preserved beyond all question by acts of landowners, and by the memory of those who knew and recollect the true situs of the original monument. In such cases it is not a lost corner.

A lost corner is one whose position can not be determined, beyond reasonable doubt, either from original marks or reliable external evidence.

Surveyors sometimes err in their decision whether a corner is to be treated as lost or only obliterated.

3. Surveyors who have been United States deputies should bear in mind that in their private capacity they must act under somewhat different rules of law from those governing original surveys, and should carefully distinguish between the provisions of the statute which guide a government deputy and those which apply to retracement of lines once surveyed. The failure to observe this distinction has been prolific of erroneous work and injustice to landowners.

4. To restore extinct boundaries of the public lands correctly, the surveyor must have some knowledge of the manner in which townships were subdivided by the several methods authorized by Congress. Without this knowledge he may be greatly embarrassed in

the field, and is liable to make mistakes invalidating his work, and leading eventually to serious litigation.

5. Various regions of this country were surveyed under different sets of instructions issued at periods ranging from 1785 to the present time. The earliest rules were given to deputy surveyors in manuscript or in printed circulars, and no copies are available for distribution.

Regulations more in detail, improving the system for greater accuracy and permanency, were issued in book form, editions of 1855, 1871, 1890, 1894, and 1902. The supply of copies of these is exhausted, except the latest, which is now sold at cost to unofficial applicants by the Superintendent of Documents.

6. The chief acts of Congress authorizing and regulating public-land surveys are summarized below to enable anyone to consult the full record thereof for explanation of difficult questions regarding early surveys.

7. Compliance with the provisions of congressional legislation at different periods has resulted in two sets of corners being established on township lines at one time; at other times three sets of corners have been established on range lines; while the system now in operation makes but one set of corners on township boundaries, except on standard lines—i. e., base and correction lines, and in some exceptional cases.

The following brief explanation of the modes which have been practiced will be of service to all who may be called upon to restore obliterated boundaries of the public-land surveys:

Where two sets of corners were established on township boundaries, one set was planted at the time the exteriors were run, those on the north boundary belonging to the sections and quarter sections north of said line, and those on the west boundary belonging to the sections and quarter sections west of that line. The other set of corners was established when the township was subdivided. This method, as stated, resulted in the establishment of two sets of corners on all four sides of the townships.

Where three sets of corners were established on the range lines, the subdivisional surveys were made in the above manner, except that the east and west section lines, instead of being closed upon the corners previously established on the east boundary of the township, were run due east from the last interior section corner, and new corners were erected at the points of intersection with the range line.

8. The method now in practice, where regular conditions are found, requires section lines to be initiated at the corners on the south boundary of the township, and to close on existing corners on the east, north, and west boundaries of the township, except that when the north boundary is a base line or standard parallel, new corners are set thereon, called closing corners. But in some cases, for special reasons, an opposite course of procedure has been followed, and subdivisional work has been begun on the north boundary and has been extended southward.

9. For the above reasons it is evident that a subsequent surveyor ought not to perform field work without knowing all the facts of the original survey, lest there be unsuspected duplication of official corners, leading him to use the wrong one in his survey. Upon township and range lines it is often necessary to procure copies of the plats of surveys on both sides, in order to become certain of the necessary

understanding of the case, as required in section 57 of this circular. A great many township plats fail to show the second set of corners, established in the survey of an adjoining township, subsequent to the plat of the former township.

10. In the more recent general instructions greater care has been exercised to secure rectangular subdivisions by fixing a strict limitation that no new township exteriors or section lines shall depart from a true meridian or east and west line more than twenty-one minutes of arc; and that where a random line is found liable to correction beyond this limit, a true line on a cardinal course must be run, setting a closing corner on the line to which it closes.

This produces, in new surveys closing to irregular old work, a great number of exteriors marked by a double set of corners. All retracing surveyors should proceed under these new conditions with full knowledge of the field notes and exceptional methods of subdivision.

SYNOPSIS OF ACTS OF CONGRESS.

11. The first enactment in regard to the surveying of the public lands was an ordinance passed by the Congress of the Confederation May 20, 1785, prescribing the mode for the survey of the "Western Territory," and which provided that said territory should be divided into "townships of six miles square, by lines running due north and south, and others crossing them at right angles" as near as might be.

It further provided that the first line running north and south should begin on the Ohio River at a point due north from the western terminus of a line run as the south boundary of the State of Pennsylvania, and the first line running east and west should begin at the same point and extend through the whole territory. In these initial surveys only the exterior lines of the townships were surveyed, but the plats were marked by subdivisions into sections 1 mile square, numbered from 1 to 36, commencing with No. 1 in the southeast corner of the township, and running from south to north in each tier to No. 36 in the northwest corner of the township; mile corners were established on the township lines. The region embraced by the surveys under this law forms a part of the present State of Ohio, and is generally known as "the Seven Ranges."

12. The Federal Congress passed a law, approved May 18, 1796, in regard to surveying the public domain, which applied to "the territory northwest of the River Ohio, and above the mouth of the Kentucky River."

Section 2 of said act provided for dividing such lands as had not been already surveyed or disposed of "by north and south lines run according to the true meridian, and by others crossing them at right angles, so as to form townships of six miles square," etc. It also provided that "one-half of said townships, taking them alternately, should be subdivided into sections containing, as nearly as may be, 640 acres each, by running through the same each way parallel lines at the end of every two miles; and by marking a corner on each of said lines at the end of every mile." The act also provided that "the sections shall be numbered, respectively, beginning with the

Act of May 18, 1796.
U. S. Statutes at Large,
vol. 1, p. 465. Section
2385, U. S. Revised
Statutes.

number one in the northeast section, and proceeding west and east alternately through the township, with progressive numbers till the thirty-sixth be completed." This method of numbering sections is still in use.

13. An act amendatory of the foregoing, approved May 10, 1800, required the "townships west of the Muskingum, which are directed to be sold in quarter townships, to be subdivided into half sections of 320 acres each, as nearly as may be, by running parallel lines through the same from east to west, and from south to north, at the distance of one mile from each other, and marking corners, at the distance of each half mile on the lines running from east to west, and at the distance of each mile on those running from south to north. And the interior lines of townships intersected by the Muskingum, and of all townships lying east of that river, which have not been heretofore actually subdivided into sections, shall also be run and marked * * *. And in all cases where the exterior lines of the townships thus to be subdivided into sections or half sections, shall exceed or shall not extend six miles, the excess or deficiency shall be specially noted, and added to or deducted from the western or northern ranges of sections or half sections in such townships, according as the error may be in running the lines from east to west or from south to north." Said act also provided that the northern and western tiers of sections should be sold as containing only the quantity expressed on the plats, and all others as containing the complete legal quantity.

14. The act approved June 1, 1796, "regulating the grants of land appropriated for military services," etc., provided for dividing the "United States Military Tract," in the State of Ohio, into townships 5 miles square, each to be subdivided into quarter townships containing 4,000 acres.

15. Section 6 of the act approved March 1, 1800, amendatory of the foregoing act, enacted that the Secretary of the Treasury was authorized to subdivide the quarter townships into lots of 100 acres, bounded as nearly as practicable by parallel lines 160 perches in length by 100 perches in width. These subdivisions into lots, however, were made upon the plats in the office of the Secretary of the Treasury, and the actual survey was only made at a subsequent time when a sufficient number of such lots had been located to warrant the survey. It thus happened, in some instances, that when the survey came to be made the plat and survey could not be made to agree, and that fractional lots on plats were entirely crowded out. A knowledge of this fact may explain some of the difficulties met with in the district thus subdivided.

16. The act of greatest importance to the work of all retracing surveyors is the one approved February 11, 1805, which is still in force, as reenacted by revision in 1873. It directs the subdivision of public lands into quarter-sections, and sets forth three principles for ascertaining the boundaries and contents of tracts of public land, after survey, in substance as follows:

17. (a) All corners marked in the surveys returned by the surveyor-general shall be established as the proper corners of the sections or quarter-sections which they were intended to designate, and corners

Act of May 10, 1800,
U. S. Statutes at Large,
vol. 2, p. 73. Section
2295, U. S. Revised
Statutes.

Act of June 1, 1796,
U. S. Statutes at
Large, vol. 1, p. 450.

Act of March 1, 1800,
U. S. Statutes at
Large, vol. 2, p. 14.

Act of February 11,
1805. U. S. Statutes
at Large, vol. 2, p. 313.
Section 2296, U. S. Re-
vised Statutes.

of half and quarter sections not marked shall be placed as nearly as possible "equidistant from those two corners which stand on the same line."

18. (b) "The boundary lines actually run and marked" (in the field) "shall be established as the proper boundary lines of the sections, or subdivisions, for which they were intended, and the length of such lines as returned by either of the surveyors aforesaid shall be held and considered as the true length thereof. And the boundary lines which shall not have been actually run and marked as aforesaid shall be ascertained by running straight lines from the established corners to the opposite corresponding corners, but in those portions of the fractional townships where no such opposite or corresponding corners have been or can be fixed, the said boundary lines shall be ascertained by running from the established corners due north and south" (see secs. 67 and 79) "or east and west lines, as the case may be, to the water course, Indian boundary line, or other external boundary of such fractional township."

19. (c) "Each section, or subdivision of section, the contents whereof shall have been returned by the surveyor-general, shall be held and considered as containing the exact quantity expressed in such return; and the half-sections and quarter-sections, the contents whereof shall not have been thus returned, shall be held and considered as containing the one-half or the one-fourth part, respectively, of the returned contents of the section of which they may make part."

20. These three principles were clearly designed for the purpose of establishing beyond dispute all lines and monuments of accepted official surveys and of placing a statutory limitation against attempts to alter the same, or to set up complaints of deficiency of area as a basis for resurvey.

PENALTIES FOR REMOVAL OF MONUMENTS.

21. Several of the States have passed laws prescribing penalties for the destruction or removal of United States survey corners, and the act of Congress quoted on page 2 relates to such destruction or removal in all the States and Territories. Any person having knowledge of a violation of the law last mentioned may present legal evidence thereof to the United States attorney for the district in which the land lies, and request the prosecution of the offender. Should any such attorney improperly refuse to take action, the matter may be called to the attention of the Department of Justice, Washington, D. C.

22. The act of Congress approved April 24, 1820, provides for the sale of public lands in half-quarter sections, and requires that "in every case of the division of a quarter section the line for the division thereof shall run north and south," and fractional sections, containing 160 acres and upwards, shall in like manner, as nearly as practicable, be subdivided into half quarter sections, under such rules and regulations as may be prescribed by the Secretary of the Treasury; but fractional sections containing less than 160 acres shall not be divided."

Act of April 24, 1820,
U. S. Statutes at Large,
vol. 3, p. 366. Section
2297, U. S. Revised
Statutes.

23. The act of Congress approved May 24, 1824, provides "that whenever, in the opinion of the President of the United States, a departure from the ordinary mode of surveying land on any river, lake, bayou, or water course would promote the public interest, he may direct the surveyor-general in whose district such land is situated, and where the change is intended to be made, under such rules and regulations as the President may prescribe, to cause the lands thus situated to be surveyed in tracts of two acres in width, fronting on any river, bayou, lake, or water course, and running back the depth of forty acres."

24. The act of Congress approved April 5, 1832, directed the subdivision of the public lands into quarter-quarter sections; that in every case of the division of a half-quarter section the dividing line should run east and west, and that fractional sections should be subdivided, under regulations prescribed by the Secretary of the Treasury. Under the latter provision the Secretary directed that fractional sections containing less than 160 acres, or the residuary portion of a fractional section, after the subdivision into as many quarter-quarter sections as it is susceptible of, may be subdivided into lots, each containing the quantity of a quarter-quarter section as nearly as practicable, by so laying down the line of subdivision that they shall be 20 chains wide, which distances are to be marked on the plat of subdivisions, as are also the areas of the quarter quarters and residuary fractions.

These two acts last mentioned provided that the corners and contents of half-quarter and quarter-quarter sections should be ascertained as nearly as possible in the manner and on the principles prescribed in the act of Congress approved February 11, 1805.

GENERAL RULES.

25. From the foregoing synopsis of congressional legislation it is evident—

First. That the boundaries of the public lands established and returned by the duly appointed government surveyors, when approved by the surveyors-general and accepted by the Government, are unchangeable.

Second. That the original township, section, and quarter-section corners established by the government surveyors must stand as the true corners which they were intended to represent, whether the corners be in the place shown by the field-notes or not.

Third. That quarter-quarter corners not established by the government surveyors shall be placed on the straight lines joining the section and quarter-section corners and midway between them, except on the last half mile of section lines closing on the north and west boundaries of the township, or on other lines between fractional sections.

Fourth. That all subdivisional lines of a section running between corners established in the original survey of a township must be straight lines, running from the proper corner in one section line to its opposite corresponding corner in the opposite section line. (See secs. 75 to 82.)

Fifth. That in a fractional section where no opposite corresponding corner has been or can be established, any required subdivision line of

such section must be run from the proper original corner in the boundary line as nearly due east and west, or north and south, as the case may be, to the water course, Indian reservation, or other boundary of such section, as due parallelism to section lines will permit, under the modifying rule in sec. 79.

26. From the foregoing it will be plain that extinct corners of the government surveys must be restored to their original locations, whenever it is possible to do so; and hence resort should always be first had to the marks of the survey in the field. The locus of the missing corner should be first identified on the ground by the aid of the mound, pits, line trees, bearing trees, etc., described in the field notes of the original survey.

27. The identification of mounds, pits, buried memorials, witness trees, or other permanent objects noted in the field notes of survey, affords the best means of relocating the missing corner in its original position. If this can not be done, clear and convincing testimony of citizens as to the place it originally occupied should be taken, if such can be obtained. In any event, whether the locus of the corner be fixed by the one means or the other, such locus should always be tested and confirmed by measurements to known corners. No definite rule can be laid down as to what shall be sufficient evidence in such cases, and much must be left to the skill, fidelity, and good judgment of the surveyor in the performance of his work.

28. Actions or decisions by county surveyors which may result in changes of boundaries of tracts of land and involve questions of ownership in connection therewith, are subject to review by the local courts in proceedings instituted in accordance with the local statutes governing such matters.

EXCEPTIONAL CASES.

29. When new measurements are made on a single line to determine the position thereon for a restored lost corner (for example, a quarter-section corner on line between two original section corners), or when new measurements are made between original corners on two lines for the purpose of fixing by their intersection the position of a restored missing corner (for example, a corner common to four sections or four townships), it will almost invariably happen that discrepancies will be developed between the new measurements and the original measurements in the field notes. When these differences occur the surveyor will in all cases establish the missing corner by proportionate measurements (see secs. 49, 83, 84, and 85) on lines conforming to the original field notes and by the method followed in the original survey. From this rule there can be no departure, since it is the basis upon which the whole operation depends for accuracy and truth.

30. In cases where the relocated corner can not be made to harmonize with the field notes in all directions, and unexplained discrepancy in the original survey is apparent, it sometimes becomes the task of the surveyor to place it according to the requirements of one line and against the calls of another line. For instance, if the line between sections 30 and 31, reported 78 chains long, would draw the missing corner on range line 1 chain eastward out of range with the other exterior corners, the presumption would be strong that the range line had been run straight and the length of the section line wrongly

reported, because experience shows that west random lines are regarded as less important than range lines and more liable to error.

31. Again, where a corner on a standard parallel has been obliterated, it is proper to assume that it was placed in line with other corners, and if an anomalous length of line reported between sections 3 and 4 would throw the closing corner into the northern township, a surveyor would properly assume that the older survey of the standard line is to control the length of the later and minor line. The marks or corners found on such a line closing to a standard parallel fix its location, but its length should be limited by its actual intersection, at which point the lost closing corner may be placed.

32. The strict rule of the law that "all corners marked in the field shall be established as the corners which they were intended to designate," and the further rule that "the length of lines returned by the surveyors shall be held and considered as the true length thereof," are found in some cases to be impossible of fulfillment in all directions at once, and a surveyor is obliged to choose, in his own discretion, which of two or more lines must yield, in order to permit the rules to be applied at all.

33. In a case of an erroneous but existing closing corner, which was set some distance out of the true state boundary of Missouri and Kansas, it was held by this office that a surveyor subdividing the fractional section should preserve the boundary as a straight line, and should not regard said closing corner as the proper corner of the adjacent fractional lots. The said corner was considered as fixing the position of the line between two fractional sections, but that its length extended to a new corner to be set on the true boundary line. The surveyor should therefore preserve such an original corner as evidence of the line; but its erroneous position should not be allowed to cause a crook between mile corners of the original state boundary. It is only in cases where it is manifestly impossible to carry out the literal terms of the law that a surveyor can be justified in making such a decision.

34. The principle of the preponderance of one line over another of less importance has been recognized in the rule for restoring a section corner common to two townships, in former editions of this circular. The new corner should be placed on the township line; and measurements to check its position by distances to corners within the townships are useful to confirm it if found to agree well, but should not cause it to be placed off the line if found not to agree, if the general condition of the boundary supports the presumption that it was properly aligned.

MAGNETIC DECLINATION.

35. The subject of the "variation," formerly deemed most important in surveys, is mentioned here only to advise against its use as a basis for the location of any lost line, though it may be a temporary guide in a preliminary search for old evidences. Its importance is greatly overrated, from lack of knowledge of the actual practice of surveyors, in the days when both their instruments and their knowledge were more primitive.

36. The General Land Office prohibits its employees and contracting surveyors from depending to any extent on courses derived from the needle. It also declines to advise other surveyors what variation to use in their own regions, for evident reasons, as follows:

The amount of local magnetism can not truly be determined by any process of mere calculation.

The secular change of declination reported at some distant time and place is no safe guide to the fact at any other station or period.

The variation recorded in old work may have been quite incorrect, as large contracts were sometimes executed by assuming a variation, from hearsay or estimation, and without due verification.

The needle is not only subject to daily and yearly change, but is also liable to defects in the instrument, so that different compasses may run different courses.

37. Another serious cause of distrust is found in the authorized rules followed in early surveys, down to the year 1864, under which a vast amount of public land was surveyed with a record showing variations which were openly inconsistent, and which should here be explained.

Before 1864, in running random and true section lines, it was required to make the record of courses on the ancient plan shown by this example: East on a random line between sections 1 and 12. Variation $13^{\circ} 15'$ E. (falling perhaps 42 links north of objective corner). West on true line between sections 1 and 12. Variation $12^{\circ} 57'$ E., etc., thus representing the "corrected" course by a nominal change of variation; whereas, after the instructions of 1864, the record would truly show the change to have been, not in the variation, but in the course, thus: N. $89^{\circ} 42'$ W. on a true line, etc.

Therefore, in a large portion of the early records, the words "east" and "west" in such connection were only approximate, while by the present system the true course is intended.

38. Terrestrial magnetism, the cause of "variation," is a fluctuating quantity, subject to unexplained changes. But since all qualified surveyors and engineers of this day are competent to make the requisite astronomical observations to determine true courses, surveying by the needle is not recommended.

MARKS ON MONUMENTS OF SURVEY.

39. Inquiries are often made to learn the meaning of the marks on corner stones. It is not practicable here to give an abstract of all the markings used in full compliance with the manual; but the following notes will suffice to explain ordinary cases:

Notches made on the east and south angles of an interior section corner indicate how many miles it is from the east and south lines of a full township; and by using the plan of a township plat, the numbers of the sections about the given corner stone will be known. In fractional townships, marks show the sections the same as if the boundaries were complete.

40. Observe that there are cases of irregular subdivision, where the stone or post is a corner of two townships or two sections only; also that stones may have been sometimes overthrown or turned around to a new and improper position.

41. On township and range lines grooves cut in the stone or post on opposite sides show distances to exterior corners of the township. Thus, two grooves on the south and four on the north indicate a corner of sections 19, 24, 25, and 30.

42. "W C" upon a monument means a witness corner, placed not at the true corner point (which may be in water or otherwise impracticable), but established elsewhere on safe ground at a distance and course shown by the official field notes and plats.

"M C" shows a meander corner, placed either on an exterior or section line at any certain distance from a section corner as shown by the plat.

43. "S C" denotes a standard corner—that is, a regular corner on a standard parallel—belonging to two sections on the north side, with a closing corner (marked C C) somewhere east or west of it, belonging to two sections on the south side of the parallel. The letters C C are also used in many other situations, where a regular line closed upon a boundary of a State, a reservation, or a private land claim.

44. Post corners and bearing trees (B T) have marks that are self-explanatory. Two chops or notches on the two opposite sides of a tree indicate that it stood upon the original line when surveyed. Such are called "line trees," and are thus distinguished from trees merely blazed near the line.

Full instructions as to the construction, marking, and differentiation of the 108 kinds of corner monuments are given in the Manual of Surveying Instructions. These should be consulted, in connection with a correct copy of the original field notes, in case of difficulty.

TO RESTORE LOST OR OBLITERATED CORNERS.

45. To restore corners on base lines and standard parallels.—Lost or obliterated standard corners will be restored to their original positions on a base line, standard parallel, or correction line, by proportionate measurements on the line, conforming as nearly as practicable to the original field notes and joining the nearest identified original standard corners on opposite sides of the missing corner or corners, as the case may be.

46. The term "standard corners" will be understood to designate standard township, section, quarter section, and meander corners; and, in addition, closing corners, in the following cases: Closing corners used in the original survey to determine the position of a standard parallel, or established during the survey of the same, will, with the standard corners, govern the alignment and measurements made to restore lost or obliterated standard corners; but no other closing corners will control in any manner the restoration of standard corners on a base line or standard parallel.

47. A lost or obliterated closing corner from which a standard parallel has been initiated or to which it has been directed will be reestablished in its original place by proportionate measurement from the corners used in the original survey to determine its position. Measurements from corners on the opposite side of the parallel will not control in any manner the relocation of said corner.

48. A missing closing corner originally established during the survey of a standard parallel as a corner from which to project surveys south will be restored to its original position by considering it a standard corner and treating it accordingly.

49. Therefore, paying attention to the preceding explanations, we have for the restoration of one or several corners on a standard par-

allel, and for general application to all other surveyed lines, the following proportion:

As the original field-note distance between the selected known corners is to the new measure of said distance so is the original field-note length of any part of the line to the required new measure thereof.

The sum of the computed lengths of the several parts of a line must be equal to the new measure of the whole distance.

50. As has been observed, existing original corners can not be disturbed; consequently discrepancies between the new and the original field-note measurements of the line joining the selected original corners will not in any manner affect measurements beyond said corners, but the differences will be distributed proportionately to the several intervals embraced in the line in question.

After having checked each new location by measurement to the nearest known corners, new corners will be established permanently and new bearings and measurements taken to prominent objects, which should be of as permanent a character as possible, and the same recorded for future reference.

51. Restoration of township corners common to four townships.—Two cases should be clearly recognized: First, where the position of the original township corner has been made to depend upon measurements on two lines at right angles to each other. Second, where the original corner has been located by measurements on one line only; for example, on a guide meridian.

52. For restoration of a township corner originally subject to the first condition: A line will first be run connecting the nearest identified original corners on the meridional township lines, north and south of the missing corner, and a temporary corner will be placed at the proper proportionate distance. This will determine the corner in a north and south direction only.

Next, the nearest original corners on the latitudinal township lines will be connected and a point thereon will be determined in a similar manner, independent of the temporary corner on the meridional line. Then through the first temporary corner run a line east (or west) and through the second temporary corner a line north (or south), as relative situations may suggest. The intersection of the two lines last run will define the position of the restored township corner, which may be permanently established.

53. The restoration of a lost or obliterated township corner established under the second condition, i. e., by measurements, on a single line, will be effected by proportionate measurements on said line, between the nearest identified original corners on opposite sides of the missing township corner, as before described.

54. Reestablishment of corners common to two townships.—The two nearest known corners on the township line, the same not being a base or a correction line, will be connected, as shown in sections 45 to 50, by a right line, and the missing corner established by proportionate distance as directed in that case; the location thus found will be checked upon by measurements to nearest known section or quarter-section corners north and south, or east and west, of the township line, as the case may be, to obtain approximate though probably not exact verification of original distances.

55. Reestablishment of closing corners.—Measure from the quarter-section, section, or township corner east or west, as the case may be, to the next preceding or succeeding corner in the order of original establishment, and reestablish the missing closing corner by proportionate measurement. The line upon which the closing corner was originally established should always be remeasured, in order to check upon the correctness of the new location. (See secs. 29 to 34 and 64 to 66 for details.)

56. Reestablishment of interior section corners.—This class of corners should be reestablished in the same manner as corners common to four townships. In such cases, when a number of corners are missing on all sides of the one sought to be reestablished, the entire distance must, of course, be remeasured between the nearest existing recognized corners both north and south, and east and west, in accordance with the rule laid down, and the new corner reestablished by proportionate measurement. The mere measurement in any one of the required directions will not suffice, since the direction of the several section lines running northward through a township, or running east and west, are only in the most exceptional cases true prolongations of the alignment of the section lines initiated on the south boundary of the township; while the east and west lines running through the township, and theoretically supposed to be at right angles with the former, are seldom in that condition, and the alignments of the closing lines on the east and west boundaries of the township, in connection with the interior section lines, are even less often in accord. Moreover, the alignment of the section line itself from corner to corner, in point of fact, also very frequently diverges from a right line, although presumed to be such from the record contained in the field notes and so designated on the plats, and becomes either a broken or a curved line. This fact will be determined, in a timbered country, by the blazes which may be found upon trees on either side of the line, and although such blazed line will not strictly govern as to the absolute direction assumed by such line, it will assist very materially in determining its approximate direction, and should never be neglected in retracements for the reestablishment of lost corners of any description. Sight or line trees described in the field notes, together with the recorded distances to same, when fully identified, will, it has been held in one or more States, govern the line itself, even when not in a direct or straight line between established corners, which line is then necessarily a broken line by passing through said sight trees. Such trees, when in existence and properly identified beyond a question of doubt, will very materially assist in evidencing the correct relocation of a missing corner. It is greatly to be regretted that the earlier field notes of survey are so very meager in the notation of the topography found on the original line, which might in very many instances materially lessen a surveyor's labors in retracement of lines and reestablishment of the required missing corner. In the absence of such sight trees and other evidence regarding the line, as in an open country, or where such evidence has been destroyed by time, the elements, or the progress of improvement, the line connecting the known corners should be run straight from corner to corner.

57. Reestablishment of quarter-section corners on township boundaries.—Only one set of quarter-section corners are actually marked in the field on township lines, and they are established at the time when

the township exteriors are run. When double section corners are found, the quarter-section corners are considered generally as standing midway between the corners of their respective sections, and when required to be established or reestablished, as the case may be, they should be generally so placed; but great care should be exercised not to mistake the corners belonging to one township for those of another. After determining the proper section corners marking the line upon which the missing quarter-section corner is to be reestablished and measuring said line, the missing quarter-section corner will be reestablished in accordance with the requirements of the original field notes of survey, by proportionate measurement between the section corners marking the line.

58. Where there are double sets of section corners on township and range lines and the quarter-section corners for sections south of the township or east of the range lines are required to be established in the field, the said quarter-section corners should be so placed as to suit the calculation of areas of the quarter sections adjoining the township boundaries as expressed upon the official township plat, adopting proportionate measurements when the present measurement of the north and west boundaries of the sections differs from the original measurement.

59. Reestablishment of quarter-section corners on closing section lines between fractional sections.—This class of corners must be reestablished proportionately, according to the original measurement of 40 chains from the last interior section corner. If the whole measurement does not agree with the original survey, the excess or deficiency must be divided proportionately between the two distances expressed in the field notes of original survey. The section corner started from and the corner closed upon should be connected by a right line, unless the retracement should develop the fact that the section line is either a broken or curved line, as is sometimes the case.

60. Reestablishment of interior quarter-section corners.—In some of the older surveys these corners are placed at variable distances, in which case the field notes of the original survey must be consulted, and the quarter-section corner reestablished at proportionate distances between the corresponding section corners, in accordance therewith. The later surveys being more uniform and in stricter accordance with law, the missing quarter-section corner must be reestablished equidistant between the section corners marking the line, according to the field notes of the original survey. The remarks made under section 56, in relation to section lines, apply with full force here also; the caution there given not to neglect sight trees is equally applicable, since the proper reestablishment of the quarter-section corner may in some instances very largely depend upon its observance, and avoid one of the many sources of litigation.

61. NOTE.—In some of the southern public-land States it was the custom in the early surveys to establish half-mile posts at a distance of 40 chains from the point from which the section line was initiated, at the same time inserting in the field notes at the midway point " $\frac{1}{2}$ sec. cor." without indication in the field notes that any other corner than the half-mile corner was set. And it is presumed that the $\frac{1}{2}$ sec. cor. was merely "called for" at that place. This practice has long been discontinued owing to the confusion thereby occasioned.

These half-mile posts have no bearing upon the subdivision of the section except where they happen to occupy the midway point on true lines between section corners. In such cases, when a subdivision is required of a section surveyed on this plan, and no original quarter corners are found, the latter should be reestablished at a point on a true line midway between the original section corners.

62. Where double corners were originally established, one of which is standing, to reestablish the other.—It being remembered that the corners established when the exterior township lines were run, belong to the sections in the townships north and west of those lines, the surveyor must first determine beyond a doubt to which sections the existing corner belongs. This may be done by testing the courses and distances to witness trees or other objects noted in the original field notes of survey, and by remeasuring distances to known corners. Having determined to which township the existing corner belongs, the missing corner may be reestablished in line from the existing corner, at the distance stated in the field notes of the original survey, by proportionate measurement, and tested by retracement to the opposite corresponding corner of the section to which the missing section corner belongs. These double corners being generally not more than a few chains apart, the distance between them can be more accurately laid off, and it is considered preferable to first establish the missing corner as above, and check upon the corresponding interior corner as noted in section 54 above.

63. Where double corners were originally established, and both are missing, to reestablish the one established when the township line was run.—The surveyor will connect the nearest known corners on the township line by a right line, being careful to distinguish the section from the closing corners, and reestablish the missing corner at the point indicated by the field notes of the original survey by proportionate measurement. The corner thus restored will be common to two sections either north or west of the township boundary, and the section north or west, as the case may be, should be carefully retraced, thus checking upon the reestablished corner, and testing the accuracy of the result. It can not be too much impressed upon the surveyor that any measurements to objects on line noted in the original survey are means of determining and testing the correctness of the operation.

64. Where double corners were originally established, and both are missing, to reestablish the one established when the township was subdivided.—The corner to be reestablished being common to two sections south or east of the township line, the section line closing on the missing section corner should be first retraced to an intersection with the township line in the manner previously indicated, and a temporary corner established at the point of intersection. The township line will of course have been previously carefully retraced in accordance with the requirements of the original field notes of survey, and marked in such a manner as to be readily identified when reaching the same with the retraced section line. The location of the temporary corner planted at the point of intersection will then be carefully tested and verified by remeasurements to objects and known corners on the township line, as noted in the original field notes of survey, and the necessary corrections made in such relocation. Should unusual error be found in one of the tested lines, the principles in "Exceptional Cases," sections 29 to 34, must

be considered. A permanent corner will then be erected at the corrected location on the township line, properly marked and witnessed, and recorded for future requirements.

65. Where triple corners were originally established on range lines, one or two of which have become obliterated, to reestablish either of them.—It will be borne in mind that only two corners were established as actual corners of sections, those established on the range line not corresponding with the subdivisional survey east or west of said range line. The surveyor will, therefore, first proceed to identify the existing corner or corners, as the case may be, and then reestablish the missing corner or corners in line north or south, according to the distances stated in the original field notes of survey in the manner indicated for the reestablishment of double corners, testing the accuracy of the result obtained, as hereinbefore directed in other cases. If, however, the distances between the triple corners are not stated in the original field notes of survey, as is frequently the case in the returns of older surveys, the range line should be first carefully retraced, and marked in a manner sufficiently clear to admit of easy identification upon reaching same during the subsequent proceedings. The section lines closing upon the missing corners must then be retraced in accordance with the original field notes of survey, in the manner previously indicated and directed, and the corners reestablished in the manner directed in the case of double corners. The surveyor can not be too careful, in the matter of retracement, in following closely all the recorded indications of the original line, and nothing, however slight, should be neglected to insure the correctness of the retracement of the original line; since there is no other check upon the accuracy of the reestablishment of the missing corners, unless the entire corresponding section lines are remeasured by proportional measurement and the result checked by a recalculation of the areas as originally returned, which, at best, is but a very poor check, because the areas expressed upon the margin of many plats of the older surveys are erroneously stated on the face of the plats, or have been carelessly calculated.

66. Where triple corners were originally established on range lines, all of which are missing, to reestablish same.—These corners should be reestablished in accordance with the foregoing directions, commencing with the corner originally established when the range line was run, establishing the same in accordance with previously given directions for restoring section and quarter-section corners; that is to say, by remeasuring between the nearest known corners on said township line, and reestablishing the same by proportionate measurement. The two remaining will then be reestablished in conformity with the general rules for reestablishment of double corners.

67. Reestablishment of meander corners.—Before proceeding with the reestablishment of missing meander corners, the surveyor should have carefully rechecked at least three of the section lines between known corners of the township within which the lost corner is to be relocated, in order to establish the proportionate measurement to be used. It is also necessary, in retracing such original lines, to ascertain the real course used by the first surveyor. For instance, where he reported meridional lines as running due north, if they are found to have an average course of $N. 1^{\circ} 20' E.$, the latter course should be considered in restoring an extinct north line to a meander corner.

68. These requirements of preliminary retracement of section lines must in no case be omitted; since it gives the only data upon which the fractional section line can be remeasured proportionately and probable course found, the corner marking the terminus, or the meander corner, being missing, which it is intended to reestablish. The missing meander corner will be reestablished on the section or township line retraced in its original location, by the proportionate measurement found by the preceding operations, from the nearest known corner on such township or section line, in accordance with the requirements of the original field notes of survey.

69. Meander corners hold the peculiar position of denoting a point on line between landowners, without usually being the legal terminus or corner of the lands owned. Leading judicial decisions have affirmed that meander lines are not strictly boundaries, and do not limit the ownership to the exact areas placed on the tracts, but that said title extends to the water which, by the plat, appears to bound the land.

As such water boundaries are, therefore, subject to change by the encroachment or recession of the stream or lake, the precise location of old meanders is seldom important, unless in States whose laws prescribe that dried lake beds are the property of the State.

70. Where the United States has disposed of the fractional lots adjacent to shores, it claims no marginal lands left by recession or found by reason of erroneous survey. The lines between landowners are therefore regarded as extended beyond the original meander line of the shore, but the preservation or relocation of the meander corner is important as evidence of the position of the section line. The different rules by which division lines should be run between private owners of riparian accretions are a matter of State legislation, and not subject to a general rule of this office.

71. Fractional section lines.—County and local surveyors being sometimes called upon to restore fractional section lines closing upon Indian, military, or other reservations, private grants, etc., such lines should be restored upon the same principles as directed in the foregoing pages, and checked whenever possible upon such corners or monuments as have been placed to mark such boundary lines.

In some instances corners have been moved from their original position, either by accident or design, and county surveyors are called upon to restore such corners to their original positions, but, owing to the absence of any and all means of identification of such location, are unable to make the result of their work acceptable to the owners of the lands affected by such corner. In such cases the advice of this office has invariably been to the effect that the relocation of such corner must be made in accordance with the orders of a court of competent jurisdiction, the United States having no longer any authority to order any changes where the lands affected by such corner have been disposed of.

RECORDS.

72. The original evidences of the public-land surveys in the following States have been transferred, under the provisions of sections 2218, 2219, and 2220, United States Revised Statutes, to the state

authorities, to whom application should be made for such copies of the original plats and field notes as may be desired, viz:

Alabama: Secretary of State, Montgomery.

Arkansas: Commissioner of State Lands, Little Rock.

Florida: Commissioner of Agriculture, Tallahassee.

Illinois: Auditor of State, Springfield.

Indiana: Auditor of State, Indianapolis.

Iowa: Secretary of State, Des Moines.

Kansas: Auditor of State and Register of State Lands, Topeka.

Louisiana: (after June 30, 1909) State officers.

Michigan: Public Domain Commissioner, Lansing.

Minnesota: Secretary of State, St. Paul.

Mississippi: Commissioner of State Lands, Jackson.

Missouri: Secretary of State, Jefferson City.

Nebraska: Commissioner of Public Lands and Buildings, Lincoln.

North Dakota: State Engineer, Bismarck.

Ohio: Auditor of State, Columbus.

Wisconsin: Commissioners of Public Lands, Madison.

In other public-land States the original field notes and plats are retained in the offices of the United States surveyors-general.

SUBDIVISION OF SECTIONS.

73. This office being in receipt of many letters making inquiry in regard to the proper method of subdividing sections of the public lands, the following general rules have been prepared as a reply to such inquiries. The rules for subdivision are based upon the laws governing the survey of the public lands. When cases arise which are not covered by these rules, and the advice of this office in the matter is desired, the letter of inquiry should, in every instance, contain a description of the particular tract or corner, with reference to township, range, and section of the public surveys, to enable the office to consult the record; also a diagram showing conditions found, giving distances in chains and links and not in feet.

74. Preliminary to subdivision it is most essential to know the actual boundaries of the section, as it can not be legally subdivided until the section corners and quarter-section corners have either been found, or restored by the preceding methods, and the resulting courses and distances determined by survey. The practice of entering a section to survey a tract from only one or two corners, and those perhaps unreliable, is unwarranted, and may result in litigation.

The order of procedure is: First reestablish the obliterated boundary corners; next, fix the lines of quarter sections; then form smaller tracts by equitable and proportionate division, according to the following rules:

75. Subdivision of sections into quarter sections.—Under the provisions of the act of Congress approved February 11, 1805, the course to be pursued in the subdivision of sections into quarter sections is to run straight lines from the established quarter-section corners, United States surveys, to the opposite corresponding corners. The point of intersection of the lines thus run will be the corner common to the several quarter sections, or, in other words, the legal center of the section.

76. Upon the lines closing on the north and west boundaries of a township, the quarter-section corners are established by the United States deputy surveyors at 40 chains to the north or west of the last interior section corners, and the excess or deficiency in the measurement is thrown into the half mile next to the township or range line, as the case may be.

77. Where there are double sets of section corners on township and range lines, the quarter corners for the sections south of the township lines and east of the range lines are not established in the field by the United States deputy surveyors, but in subdividing such sections said quarter corners should be so placed as to suit the calculations of the areas of the quarter sections adjoining the township boundaries as expressed upon the official plat, adopting proportionate measurements where the new measurements of the north or west boundaries of the section differ from the original measurements.

78. Subdivision of fractional sections.—Where opposite corresponding corners have not been or can not be fixed, the subdivision lines should be ascertained by running from the established corners due north, south, east, or west lines, as the case may be, to the water course, Indian boundary line, or other boundary of such fractional section.

79. The law presumes the section lines surveyed and marked in the field by the United States deputy surveyors to be due north and south or east and west lines, but in actual experience this is not always the case. Hence, in order to carry out the spirit of the law, it will be necessary in running the subdivisional lines through fractional sections to adopt mean courses, where the section lines are not due lines, or to run the subdivision line parallel to the east, south, west, or north boundary of the section, as conditions may require, where there is no opposite section line.

80. Subdivision of quarter sections into quarter quarters.—Preliminary to the subdivision of quarter sections, the quarter-quarter corners will be established at points midway between the section and quarter-section corners, and between quarter corners and the center of the section, except on the last half mile of the lines closing on the north or west boundaries of a township, where they should be placed at 20 chains, proportionate measurement, to the north or west of the quarter-section corner.

81. The quarter-quarter section corners having been established as directed above, the subdivision lines of the quarter section will be run straight between opposite corresponding quarter-quarter section corners on the quarter-section boundaries. The intersection of the lines thus run will determine the place for the corner common to the four quarter-quarter sections.

82. Subdivision of fractional quarter sections.—The subdivision lines of fractional quarter sections will be run from properly established quarter-quarter section corners, with courses governed by the advice in sections 67 and 79, to the lake, water course, or reservation which renders such tracts fractional, or parallel to the east, south, west, or north boundary of the quarter section, as conditions may require.

83. By "proportionate measurement" of a part of a line is meant a measurement having the same ratio to that recorded in the original field notes for that portion as the length of the whole line by actual

resurvey bears to its length as given in the record. Differences between former and new measurements may generally be expected. They may occur through using a chain of erroneous length, or by careless setting of pins, by neglect of leveling, or by error in transcribing notes, and these should be carefully avoided in retracement as in original surveys. Instead of the old practice of "adjusting the chain" to suit the former measure, the distance taken by a precise method is compared with that of the record, and the shortage or surplus is computed by proportion, producing the same result in a more reliable manner.

84. For example: The length of the line from the quarter-section corner on the west side of sec. 2, T. 24 N., R. 14 E., Wisconsin, to the north line of the township, by the United States deputy surveyor's chain, was reported as 45.40 chains, and by the county surveyor's measure is reported as 42.90 chains; then the distance which the quarter-quarter section corner should be located north of the quarter-section corner would be determined as follows:

85. As 45.40 chains, the government measure of the whole distance, is to 42.90 chains, the county surveyor's measure of the same distance, so is 20.00 chains, original measurement, to 18.90 chains by the county surveyor's measure, showing that by proportionate measurement in this case the quarter-quarter section corner should be set at 18.90 chains north of the quarter-section corner, instead of 20.00 chains north of such corner, as represented on the official plat. In this manner the discrepancies between original and new measurements are equitably distributed.

86. A resurvey must be initiated at some well-defined, identified, and unquestioned starting point on the original surveys. It must terminate at some equally well-known and identified point; the intermediate corners being placed along that line in proportion as the whole redetermined distance is to the whole distance as originally reported. For example, should a line originally reported to be 160.00 chains be found by resurvey to be 164.00 chains, then the corners, originally reported as being placed 40.00 chains apart, will be placed 41.00 chains apart, and will be so reported by the later surveyor. This it will be seen requires that the whole distance between two well-defined corners (or points) be accurately known, in order to give the intermediate reestablished corners their proper relative positions, or distance apart.

FRED DENNETT,
Commissioner.

DEPARTMENT OF THE INTERIOR,
June 1, 1909.

Approved:
R. A. BALLINGER,
Secretary.

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**END OF
TITLE**